

HRDLICKA (A)

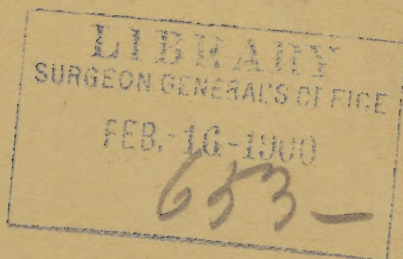
ESQUIMO BRAIN.



By ALES HRDLICKA, M. D.



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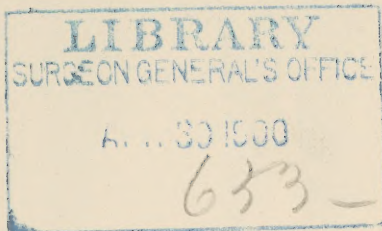




PLATE I.—Kishu and Menee (photographed on their admission to Bellevue Hospital).

ESQUIMO BRAIN.*

By ALES HRDLICKA, M. D.,
New York, N. Y.

The brain in question is that of Kishu, an adult male Esquimo of about forty-five years of age, who died of acute general tuberculosis (1).

Kishu was a chief of his tribe; he measured 1.64 cm. in height, weighed about 170 pounds was muscular, and in every respect normally developed. He died within less than five months after the inception of the disease. Figure No. 1 shows him, together with his son, as he was on admission to the hospital.

The autopsy on the body was performed in my presence by Dr. Harlow Brooks, one of the associates of the Pathological Institute at Bellevue Hospital, where the Esquimo died. I am indebted to Dr. Brooks for some notes concerning the general condition of the brain and its membranes. And I am indebted to the authorities of the Anthropological Department of the New York American Museum of Natural History, and to the officers of the Medical Department of Bellevue Hospital for the privilege of being allowed to measure and examine the specimen.

Before the skull was opened, I secured the following measurements on the head:

1. Kishu was one of the six Esquimaux who were brought to New York in 1896, by Lieutenant Peary, from the neighborhood of Smith's Sound. Of these six Esquimaux four, including Kishu, have since succumbed to acute tuberculosis; one was sent back to Smith's Sound; and a boy of about twelve years survives, after having recovered from incipient pulmonary tuberculosis, in the care of Mr. Wallace, the Superintendent of the American Museum of Natural History. The brains of the other three Esquimaux who died are being examined by Prof. Geo. S. Huntington, of Columbia College.

* Read at the Annual Meeting of the American Medico-Psychological Association, New York, N. Y., May, 1899.

HEAD.

Diam. antero-post. max.....	19.8 cm.
“ lateral max.....	15.1 cm.
(Cephalic Index 76.26.).	
Height (from line between the aud. meati).....	14.2 cm.
Diam. biauricular (between the depressions over the roots of zygomae, in front of the ear)	13.2 cm.
“ frontal minimum.....	10.4 cm.
Circumference max.....	56.8 cm.
Diam. bigonial	11.1 cm.

FACE.

Diam. bizygomatic max.....	14.5 cm.
Height of face: Chin to nasion	12.3 cm.
“ interciliary line	14.3 cm.
“ insertion of hair.....	20.0 cm.

These measurements agree in main with those which I have taken on the other Esquimaux from the same locality.

The scalp was found to be less than average in thickness; this was undoubtedly due to the advanced general emaciation of the subject.

The skull is entirely symmetrical, the sutures are well traceable and all appear to be still pervious (1). Skull-cap thin.

No adhesion to the dura, the soft membranes normal. Several masses of Pacchionian granulations over the longitudinal sinus. No tuberculosis (2) nor any other pathological lesion. Very small quantity of fluid.

There is a pronounced pigmentation of the pia and arachnoid, from the pons to over and below the calamus scriptorius.

Weight of brain denuded of dura mater, after a few minutes exposure for drain, 1503 grammes (3). (Brain was laid in 20 parts 5 per cent. formaline and 80 parts 95 per cent. alcohol, which solution was expected to harden it without changing its volume.)

1. The dry skull shows the beginnings of ossification in several of the sutures.

2. The brain and the heart were about the only organs where tubercular lesions were absent.

3. Mean weight of white male brain in 154 men of mean height of 1.680 m., equal 1361.5 g. (Broca).

Mean weight of white male brain in 168 men of mean height of 1.679 m., equal 1357.5. (Manouvrier).

EXAMINATION OF THE BRAIN.

(Three weeks after death.)

Weight.—The brain was denuded of the membranes and divided into its principal parts. After 15 m. drainage the whole and the different parts were found to weigh as follows:

Whole encephalon, 1325.0 gr.

(Loss in three weeks through solution, and through loss of membranes, 178.0).

Cerebrum, 1155.0 gr. or 87.17 % of the total.

r. hemisphere, 577.0 gr.

l. " 578.0 gr.

Cerebellum, 142.0 gr. or 10.72 % of the total.

Pons & Bulb, 28.0 gr. or 2.1 % of the total.*

The study of a single Esquimo brain cannot, naturally, lead to any definite conclusions as to the morphological peculiarities of the brain in this particular race of people. Hence in resuming the study of the specimen, I can only speak of its individual characters, that is of the similarities and differences it shows when compared to an average white brain.

As a whole, this Esquimo brain is heavier and larger than the average brain of white men of similar stature. The excess of weight over the averages of both Broca's and Manouvrier's specimens, averages which agree well with those obtained by Bischoff, Boyd, Sims, Huschke, and other observers, amounts to almost 150 grammes.

As to size, according to Huschke, the average antero-post. diameter of the white male brain ranges between 16.0 and 17.0 cm., and the average maximum lateral diameter 14.0 cm. Similar measures on Kushan's brain gave us, for the length, 18.0 cm., with the left and 17.85 cm., with the right hemisphere, and for the breadth, 14.2 cm., each measure showing thus almost 2 mm. excess over the same average measures on white male brain.

* In white brain, the proportionate weight of the cerebellum, medulla and pons together, is to that of the whole brain in the adult as 13 to 87. (Huschke).

The cerebellum is 10.7 of the total encephalon (Meynert). According to Broca, the relative weights to that of the whole encephalon are: Cerebrum, 87.3 %; Cerebellum, 10.6 %; Pons and Bulb, 1.91 %.

As to the hemisphere, in 264 men Broca found the right to be the heavier in 138 cases, the left in 105 cases; the weight was even in 21 cases.

In its external conformation the Esquimo cerebrum exceeds that of an average white male in the number, extent and depth of the sulci, and in the complexity of the gyrations.

The large size and the complex conformation of the Esquimo cerebrum oblige us to consider the same as having attained a very fair degree of development and differentiation, a degree not inferior to that met with in the average white person.

The different parts of the Esquimo encephalon do not show the same relative proportions as they do in the average white brain; and the same fact is found when we consider separately the different principal parts of the cerebrum alone. The detailed figures* show that in Kishu's brain the cerebral hemisphere are *proportionately* lighter, the cerebellum, and particularly the pons with the bulb, proportionately heavier, than are similar parts of the brains of white males. Of the cerebral divisions, the frontal lobes (parts anterior to the fissure of Rolando) are about equal in size to similar average parts in the brains of white people; but the lobes posterior to the fissure of Rolando are considerably larger in the Esquimo than they are in the average white male cerebrum.

In consequence of the above the proportionate relations of the principal parts of the cerebrum are seen to be different in Kishu's brain from what they are ordinarily in the whites. The differences are such as would denote a zoological inferiority of Kishu's cerebrum. This inferiority may be fully compensated for by the advanced evolution of the cortex.

The Esquimo cerebrum offers in addition to the above a great many points of interest. The two hemispheres differ very widely in their conformation.

The principal differences between the two halves of the brain consist in the considerably greater size of the whole temporo-sphenoidal and the limbic lobes on the right side, and in the apparently much larger development on the right of Broca's cap, or the speech centre. The right hemisphere shows a remarkable vertical gyration. Its inferior parietal convolution is more voluminous than that on the left side.

On the left hemisphere, there is observable in general a somewhat more complex gyration. The mesial part of the superior

* Which will be given when this paper is published in extenso.

frontal gyrus, the paracentral lobule, the precuneus, and the whole occipital lobe are more voluminous on this side. The whole left hemisphere is slightly longer than the right, notwithstanding the fact that the right temporo-sphenoidal lobe is longer than the same part on the left side. The left Sylvian fissure (main limb) is longer, the left Rolandic fissure is situated more posteriorly and is more vertical (greater length of the inferior frontal convolution and the opercula), than the right. And there are many differences between, and peculiarities of, the individual gyri, fissures, and sulci on the two hemispheres.

It is difficult to form any substantiated opinion as to the meaning of even the most pronounced peculiarities and variations observed in this interesting brain. Those parts of the hemispheres wherein are situated the centres of the senses of sight and hearing and also those of smell, are largely developed and the centres exceed in extent the same parts in the average male brain of whites. All these centres, with the possible exception of that of sight, seem to be more developed on the right hemisphere, where we also find the prominent Broca's convolution.

The motor areas of the hemispheres are apparently very well developed.

The intellectual areas show good absolute extent and an advanced differentiation. They are superior both in size and complexity on the left to those on the right hemisphere.

Kishu seemed, so far as I had the chance to observe him in life, intellectually superior to the other two men in the company. The fact that he was the chief of his little tribe would speak for his mental capacity.

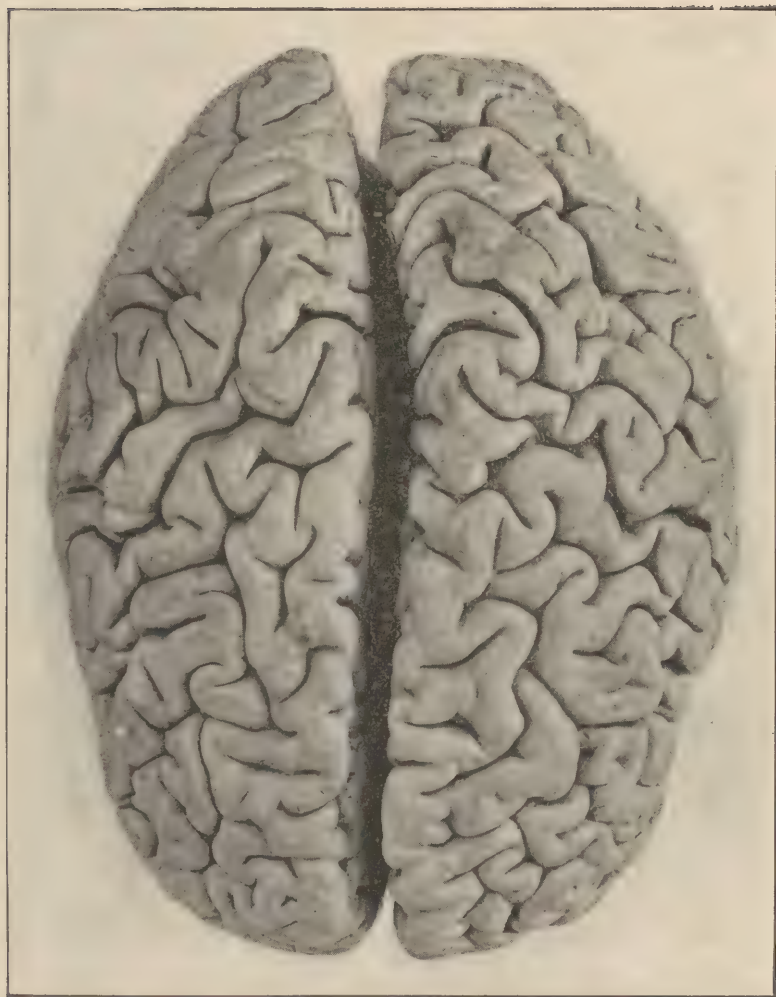


PLATE II.--Kishu's Cerebrum (dorsal aspect).

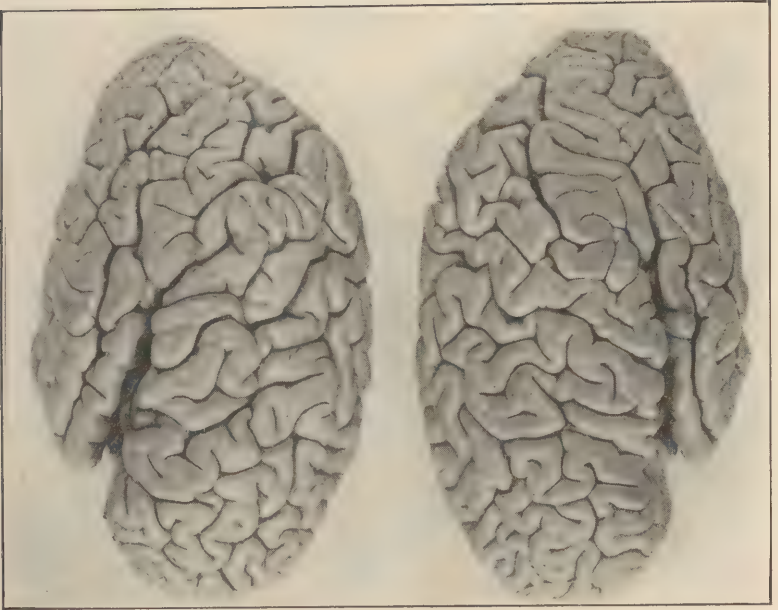


PLATE III. --The Hemispheres of Kishu's Cerebrum (lateral aspect).



PLATE IV.—The Hemispheres of Kishu's Cerebrum (mesial aspect).

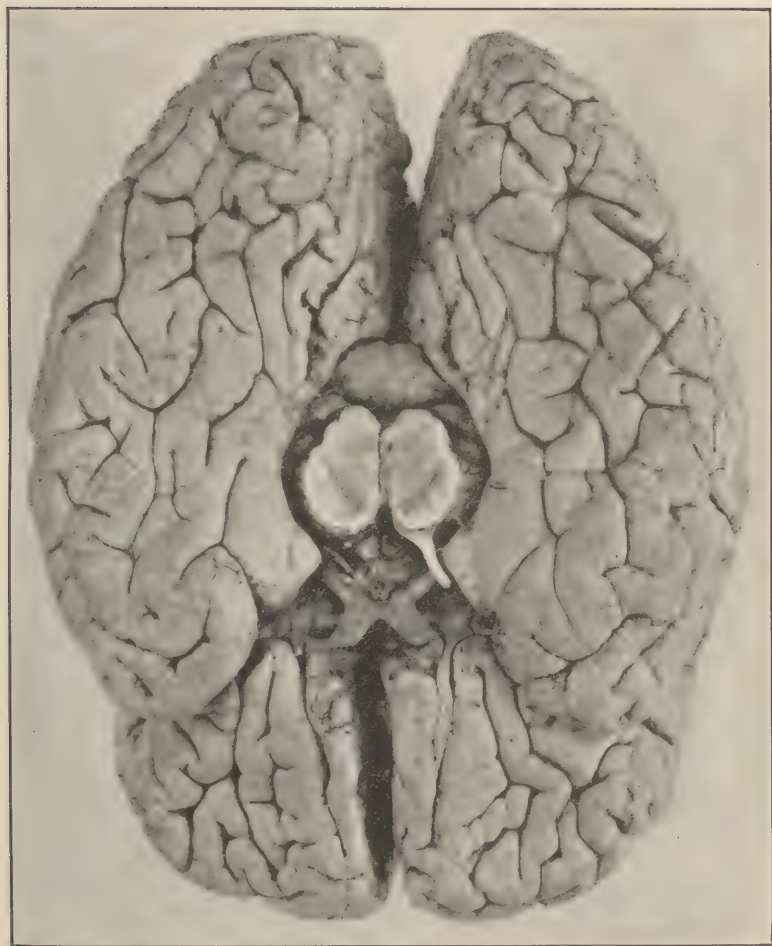


PLATE V.—Kishu's Cerebrum (basal aspect).

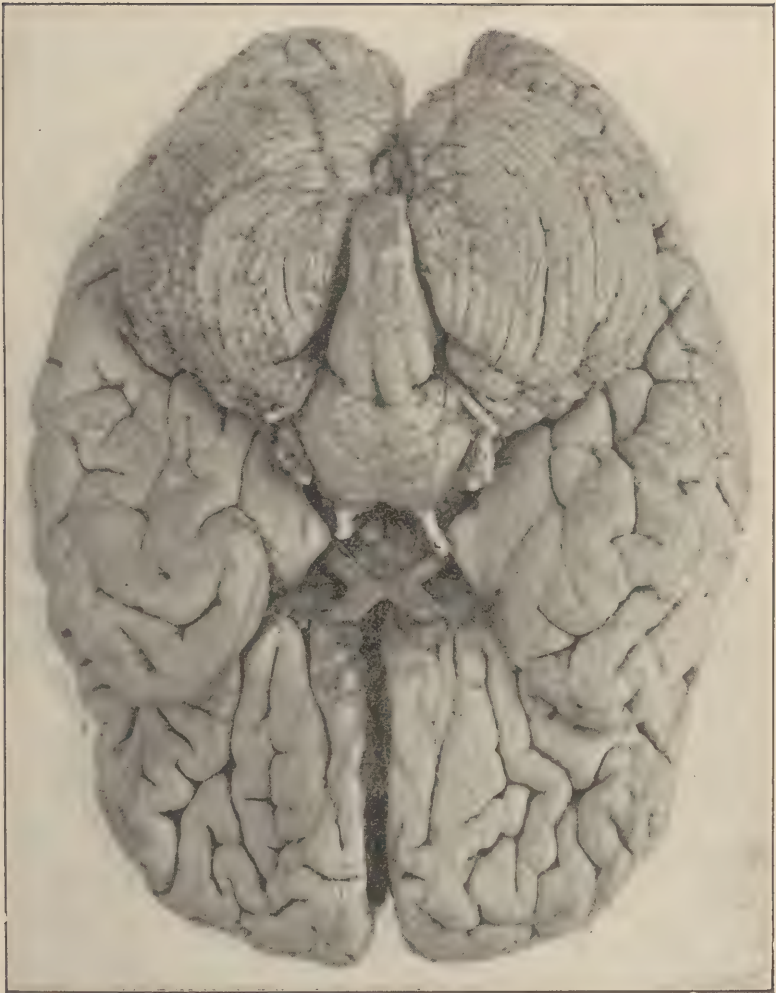


PLATE VI.—Kishu's Encephalon (basal aspect).

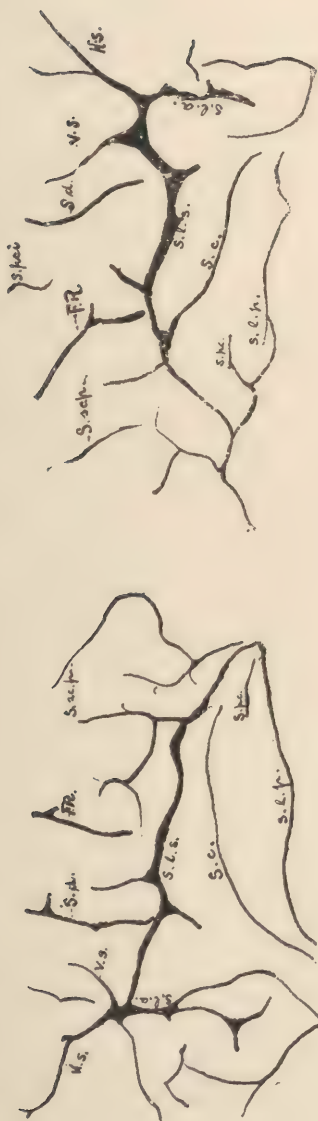


FIG. I.—Left Island of Reil.

FIG. II.—Right Island of Reil.

- F. R.—Fissure of Rolando.
- S. D.—Sulcus diagonalis
- V. S.—Vertical branch of anterior sylvian f.
- H. S.—Horizontal branch of anterior sylvian f.
- S. pcl.—Sulcus presentralis infer.
- S. sc. p.—Sulcus subcentralis poster.
- S. c.—Sulcus centralis insulae.
- S. l. s. l. a. s. l. p.—Sulci limitantes super. anter. poster
- S. c.—Sulcus postcentralis insulae.

